

REMARKS

Applicants respectfully request reconsideration in view of the above amendments and the following remarks. Applicants amend claims 1, 3-5, 10, 16, 18-20 and 25. Applicants cancel claims 2 and 17. Applicants do not add any claims. Accordingly, claims 1, 3-16, and 18-30 remain pending in the application.

I. Claim Amendments

Applicants amend claims 1 and 16 to correct the typographical error “branch location” to “branch point,” so as to provide proper antecedent basis for the later use of “branch point.” Applicants do not believe that these amendments narrow the scope of the claims.

Claims 1 and 16 have also been amended to incorporate limitations from original claims 2 and 17, which originally depended from claims 1 and 16, respectively. Applicants cancel claims 2 and 17. Accordingly, Applicants amend claim 3-5 and 18-20, which originally depended from claims 2 and 17, respectively, to depend from amended independent claims 1 and 16, respectively.

Further, Applicants amend independent claims 1, 10, 16, and 25 according to Examiner’s suggestion (Office Action, p. 3), to explicitly define an “exact convergence point” as described in the specification, as well as to clarify that the claimed re-execution of instructions occurs “only upon detecting said exact convergence point.” Support for these amendments may be found in the specification at paragraphs 0015 and 0021-0027.

II. Claims Rejected Under 35 U.S.C. § 103

Claims 1, 3-5, 8-14, 16, 18-20 and 23-29 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over “Reducing Branch Misprediction Penalties Via Dynamic

Control Independence Detection” by Chou et al. (hereinafter “Chou”) in view of U.S. Patent No. 6,542,984 issued to Keller, et al (hereinafter “Keller”).

To establish a *prima facie* case of obviousness Examiner must show that the cited references teach or suggest each of the elements of a claim.

In regard to claims 1 and 16, as amended, these claims include “a first circuit to detect an exact convergence point subsequent to said branch point in said program, said exact convergence point being a point at which a path mispredicted from said branch point converges with a correct path at a point of said correct path immediately following said branch point” and “a scheduler . . . to re-execute selected instructions of said program subsequent to said branch point, only upon detecting said exact convergence point” (emphasis added).

Examiner has not relied upon and Applicants have been unable to discern any part of Chou or Keller that teaches these elements of claims 1 and 16. Chou “detects all convergence points (which are referred to in Chou as first control independent instructions)” (Examiner Interview Summary, Dec. 4, 2006, p. 3), and, as Examiner has agreed, does not differentiate between exact convergence points as defined in claims 1 and 16, and convergence points that are not exact convergence points (*see* Examiner Interview Summary, p. 3). Hence, Chou re-executes instructions upon detecting a convergence point, regardless of whether it is an exact convergence point, *see, e.g., Chou*, at § 2.1.2.1., and thus does not re-execute instructions “only upon detecting said exact convergence point,” as recited in claims 1 and 16.

Thus, Chou in view of Keller does not teach or suggest each of the elements of claims 1 and 16, as amended. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 1 and 16 are requested.

In regard to claims 10 and 25, as amended, include elements similar to those of claims 1 and 16, including “re-executing a second selected subset of said set of instructions, subsequent to

an exact convergence point . . . only upon detecting said exact convergence point, said exact convergence point being a point at which a path mispredicted from said mispredicted branch point converges with a correct path at a point of said correct path immediately following said mispredicted branch point” (emphasis added). For at least the reasons discussed above regarding claims 1 and 16, Chou in view of Keller also does not teach or suggest each of the elements of claims 10 and 25, as amended. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 10 and 25 are requested.

In regard to claims 3-5, 8, 9, 11-14, 18-20, 23, 24, and 26-29, these claims depend from independent claims 1, 10, 16, and 25, respectively, and incorporate the limitations thereof. Thus, at least for the reasons mentioned above in regard to the independent claims, these claims are not obvious over Chou in view of Keller. Accordingly, reconsideration and withdrawal of the obviousness rejection of these claims are requested.

Claims 6 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chou in view of Keller and further in view of “Computer Architecture: A Quantitative Approach” by Hennessey et al., (hereinafter “Hennessey”).

Claims 6 and 21 depend from independent claims 1 and 16, respectively, and these claims incorporate the limitations of their respective independent claims. Thus, at least for the reasons mentioned above in regard to independent claims 1 and 16, Chou in view of Keller does not teach each of the elements of these claims. Further, Hennessey does not cure the defects of Chou and Keller. Examiner has not relied upon and Applicants have been unable to discern any part of Hennessey that teaches or suggests a first circuit to detect an exact convergence point. Thus, Chou, Keller, and Hennessey do not teach or suggest each of the elements of claims 6 and 21. Accordingly, reconsideration and withdrawal of the obviousness rejection of these claims are requested.

Claims 7 and 22 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Chou in view of Keller in view of Hennessey and in further view of “Branch Prediction Using Selective Branch Inversion” by Manne et al. (hereinafter “Manne”).

Claims 7 and 22 depend from independent claims 1 and 16 and incorporate the limitations thereof. Thus, at least for the reasons mentioned above in regard to independent claims 1 and 16, Chou and Keller do not teach or suggest each of the elements of these claims. Further, neither Hennessey nor Manne cures the defects of Chou and Keller. Examiner has not relied upon and Applicants have been unable to discern any part of Hennessey or Manne that teaches or suggests a first circuit to detect an exact convergence point. Thus, Chou, Keller, Hennessey and Manne fail to teach or suggest each of the elements of claims 7 and 22. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 7 and 22 are requested.

Claims 15 and 30 stand rejected under 35 U.S.C. § 103 as being unpatentable over Chou in view of Keller and in further view of Manne.

Claims 15 and 30 depend from independent claims 10 and 25, respectively, and incorporate the limitations thereof. Thus, at least for the reasons mentioned above in regard to independent claims 10 and 25, Chou and Keller fail to teach each of the elements of these claims. Further, Manne does not cure the defects of Chou and Keller. Examiner has not relied upon and Applicants have been unable to discern any part of Manne that teaches or suggests a first circuit to detect an exact convergence point. Thus, Chou, Keller, and Manne do not teach or suggest each of the elements of claims 15 and 30. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 15 and 30 are requested.

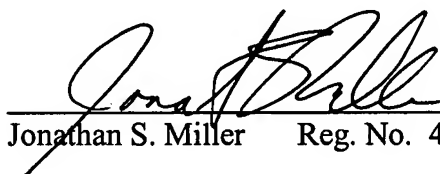
CONCLUSION

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If Examiner believes that a telephone conference would be useful in moving the application forward to allowance, Examiner is encouraged to contact the undersigned at (310) 207-3800.

Respectfully submitted,

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